

## Refine Search

### Search Results -

Terms	Documents
6560617.uref.	2

Database:

US Pre-Grant Publication Full-Text Database  
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 Derwent World Patents Index  
 IBM Technical Disclosure Bulletins

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### Search History

 DATE: Saturday, February 26, 2005    [Printable Copy](#)    [Create Case](#)

<u>Set Name</u> side by side	<u>Query</u>	<u>Hit Count</u>	<u>Set Name</u> result set
<i>DB=PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD; PLUR=YES; OP=OR</i>			
<u>L2</u>	6560617.uref.	2	<u>L2</u>
<i>DB=USPT; PLUR=YES; OP=OR</i>			
<u>L1</u>	6560617.pn.	1	<u>L1</u>

END OF SEARCH HISTORY

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## Refine Search

### Search Results -

Terms	Documents
5295258.pn.	2

Database:

US Pre-Grant Publication Full-Text Database  
 US Patents Full-Text Database  
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### Search History

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<u>Set Name</u> side by side	<u>Query</u>	<u>Hit Count</u>	<u>Set Name</u> result set
<i>DB=PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD; PLUR=YES; OP=OR</i>			
<u>L7</u>	5295258.pn.	2	<u>L7</u>
<u>L6</u>	"ohran, michael".in.	9	<u>L6</u>
<u>L5</u>	5611049.pn.	2	<u>L5</u>
<u>L4</u>	5987627.pn.	2	<u>L4</u>
<u>L3</u>	5241672.pn.	2	<u>L3</u>
<u>L2</u>	5276867.pn.	2	<u>L2</u>
<u>L1</u>	5157663.pn.	2	<u>L1</u>

END OF SEARCH HISTORY

## Hit List

Clear

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Fwd Refs

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Search Results - Record(s) 1 through 9 of 9 returned.

☐ 1. Document ID: US 20020112134 A1

Using default format because multiple data bases are involved.

L6: Entry 1 of 9

File: PGPB

Aug 15, 2002

PGPUB-DOCUMENT-NUMBER: 20020112134

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020112134 A1

TITLE: Incrementally restoring a mass storage device to a prior state

PUBLICATION-DATE: August 15, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Ohran, Richard S.	Henderson	NV	US	
<u>Ohran, Michael</u> R.	Orem	UT	US	

US-CL-CURRENT: 711/162; 711/114, 714/6

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Draws De
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☐ 2. Document ID: US 20010037371 A1

L6: Entry 2 of 9

File: PGPB

Nov 1, 2001

PGPUB-DOCUMENT-NUMBER: 20010037371

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20010037371 A1

TITLE: Mirroring network data to establish virtual storage area network

PUBLICATION-DATE: November 1, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
<u>Ohran, Michael</u> R.	Orem	UT	US	

APPL-NO: 09/ 892161 [PALM]

DATE FILED: June 26, 2001

RELATED-US-APPL-DATA:

Application 09/892161 is a continuation-in-part-of US application 09/271585, filed

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March 18, 1999, PENDING

Application 09/271585 is a continuation-of US application 08/848139, filed April 28, 1997, US Patent No. 5978565

INT-CL: [07] G06 F 15/167

US-CL-PUBLISHED: 709/214; 709/232

US-CL-CURRENT: 709/214; 709/232

REPRESENTATIVE-FIGURES: 1

#### ABSTRACT:

Mirroring data to provide a virtual storage area network using policing protocols and mirror engines without a physical shared storage node. The mirror engines are found at each server computer in the network in order to mirror the data between mass storage devices of the servers as the servers receive and execute write operations, which results in each mass storage device containing the same stored data. The policing protocols prevent data corruption by not allowing more than one server at a time write to a file of data. If one server experiences failure and is incapable of providing access to network data, the other server or servers can service all read requests, since all network data is accessible by all servers. Unlike conventional storage area networks, there is no physical shared storage node and, accordingly, the costs of obtaining and operating the virtual storage area network are relatively small.

#### RELATED APPLICATIONS

[0001] This application is a continuation-in-part of U.S. patent application Ser. No. 09/271,585, entitled "Operation of Standby Server to Preserve Data Stored By a Network Server," filed Mar. 18, 1999, which is a continuation of U.S. patent application Ser. No. 08/848,139, filed Apr. 28, 1997, entitled "Method for Rapid Recovery from a Network File Server Failure Including Method for Operating Co-Standby Servers," now issued as U.S. Pat. No. 5,978,565. The foregoing patent and patent application are incorporated herein by reference.

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KMIC	Draw D
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### ☐ 3. Document ID: US 6560617 B1

L6: Entry 3 of 9

File: USPT

May 6, 2003

US-PAT-NO: 6560617

DOCUMENT-IDENTIFIER: US 6560617 B1

TITLE: Operation of a standby server to preserve data stored by a network server

DATE-ISSUED: May 6, 2003

#### INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Winger; John M.	Alpine	UT		
Green; David	Pleasant Grove	UT		

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Ohran; Richard S.	Provo	UT
<u>Ohran; Michael R.</u>	Orem	UT

## ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Legato Systems, Inc.	Mountain View	CA			02

APPL-NO: 09/ 271585 [PALM]  
DATE FILED: March 18, 1999

## PARENT-CASE:

RELATED APPLICATIONS This is a continuation of U.S. patent application Ser. No. 08/848,139, entitled "Method for Rapid Recovery from a Network File Server Failure Including Method for Operating Co-Standby Servers," filed Apr. 28, 1997 now U.S. Pat. No. 5,978,565. U.S. patent application Ser. No. 08/848,139 is a continuation of application Ser. No. 08/441,157, entitled "Method for Rapid Recovery from a Network File Server Failure Including Method for Operating Co-Standby Servers," filed May 15, 1995, now abandoned, which is a continuation-in-part of application Ser. No. 08/094,755, entitled "Method for Rapid Recovery from a Network File Server Failure," filed Jul. 20, 1993, now abandoned. The foregoing patent applications and issued patents are incorporated herein by reference.

INT-CL: [07] G06 F 17/30, H02 H 3/05

US-CL-ISSUED: 707/204; 707/10, 707/100, 707/200, 714/4, 714/6, 714/15

US-CL-CURRENT: 707/204; 707/10, 707/100, 707/200, 714/15, 714/4, 714/6

FIELD-OF-SEARCH: 707/1, 707/10, 707/100, 707/104.1, 707/200, 707/206, 707/204, 714/15, 714/4, 714/6

## PRIOR-ART-DISCLOSED:

## U.S. PATENT DOCUMENTS

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<u>4792896</u>	December 1988	Maclean et al.	703/25
<u>5157663</u>	October 1992	Major et al.	371/9.1
<u>5307481</u>	April 1994	Shimazaki et al.	395/575
<u>5408649</u>	April 1995	Beshears et al.	395/575
<u>5438674</u>	August 1995	Keele et al.	711/4
<u>5455932</u>	October 1995	Major et al.	395/489
<u>5488716</u>	January 1996	Schneider et al.	395/182.08
<u>5533191</u>	July 1996	Nakano	395/182.09
<u>5555371</u>	September 1996	Duyanovich et al.	714/13
<u>5600784</u>	February 1997	Bissett et al.	709/400
<u>5611049</u>	March 1997	Pitts	707/8
<u>5633999</u>	May 1997	Clowes et al.	395/182.04
<u>5666479</u>	September 1997	Kashimoto et al.	395/180
<u>5987627</u>	November 1999	Rawlings, III	714/48

## OTHER PUBLICATIONS

Steinberg, Jeffrey A., "Diverting Data From Disaster," Digital Review, vol. 8, No. 35, Nov. 18, 1991.

ART-UNIT: 3624

PRIMARY-EXAMINER: Millin; Vincent

ASSISTANT-EXAMINER: Colbert; Ella

ATTY-AGENT-FIRM: Workman, Nydegger & Seeley

ABSTRACT:

A method for providing rapid recovery from a network file server failure through the use of a backup computer system. The backup computer system runs a special mass storage access program that communicates with a mass storage emulator program on the network file server, making the disks or other mass storage devices on the backup computer system appear like they were disks on the file server computer. By mirroring data by writing to both the mass storage of the file server and through the mass storage emulator and mass storage access program to the disks on the backup computer, a copy of the data on the file server computer is made. Optionally, selected portions of the data read through the mass storage emulator program can be altered before being returned as the result of the read operation on the file server. In the event of failure of the file server computer, the backup computer can replace the file server, using the copy of the file server's data stored on its disks. A single backup computer can support a plurality of file server computers. Unlike other redundant file server configurations, this method does not require the backup computer system to be running the file server operating system.

42 Claims, 4 Drawing figures

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Draw. De
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☐ 4. Document ID: US 5978565 A

L6: Entry 4 of 9

File: USPT

Nov 2, 1999

US-PAT-NO: 5978565

DOCUMENT-IDENTIFIER: US 5978565 A

**\*\* See image for Certificate of Correction \*\***

TITLE: Method for rapid recovery from a network file server failure including method for operating co-standby servers

DATE-ISSUED: November 2, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
<u>Ohran; Michael R.</u>	Orem	UT		
Ohran; Richard S.	Provo	UT		
Green; David	Pleasant Grove	UT		
Winger; John M.	Alpine	UT		

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## ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Vinca Corporation	Orem	UT			02

APPL-NO: 08/ 848139 [PALM]  
DATE FILED: April 28, 1997

## PARENT-CASE:

CROSS-REFERENCES TO RELATED APPLICATIONS This is a continuation of application Ser. No. 08/441,157, filed May 15, 1995, in the names of Richard S. Ohran, Michael R. Ohran, John M. Winger, and David Green for METHOD FOR RAPID RECOVERY FROM A NETWORK FILE SERVER FAILURE INCLUDING METHOD FOR OPERATING CO-STANDBY SERVERS, now abandoned, which is a continuation-in-part of application Ser. No. 08/094,755, filed Jul. 20, 1993, now abandoned in the names of Richard Ohran and Terry Dickson for METHOD FOR RAPID RECOVERY FROM A NETWORK FILE SERVER FAILURE, now abandoned.

INT-CL: [06] G06 F 11/20

US-CL-ISSUED: 395/182.11; 395/182.04, 395/182.08  
US-CL-CURRENT: 714/13; 714/10, 714/6

FIELD-OF-SEARCH: 395/181, 395/182.02, 395/182.04, 395/182.05, 395/182.08, 395/182.09, 395/182.11, 395/500

## PRIOR-ART-DISCLOSED:

## U.S. PATENT DOCUMENTS

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<u>5157663</u>	October 1992	Major et al.	395/182.08
<u>5307481</u>	April 1994	Shimazaki et al.	395/182.09
<u>5408649</u>	April 1995	Beshears et al.	395/182.08
<u>5455932</u>	October 1995	Major et al.	711/162
<u>5488716</u>	January 1996	Scheider et al.	395/182.08
<u>5533191</u>	July 1996	Nakano	395/182.09
<u>5633999</u>	May 1997	Clowes et al.	395/182.04
<u>5666479</u>	September 1997	Kashimoto et al.	395/180

## OTHER PUBLICATIONS

Steinberg, "Diverting Date From Disaster", Digital Review, V8, N35, Nov. 1991.

ART-UNIT: 273

PRIMARY-EXAMINER: An; Meng-Al T.

ASSISTANT-EXAMINER: Davis, Jr.; Walter D.

ATTY-AGENT-FIRM: Workman Nydegger & Seeley

## ABSTRACT:

A method for providing rapid recovery from a network file server failure through

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the use of a backup computer system. The backup computer system runs a special mass storage access program that communicates with a mass storage emulator program on the network file server, making the disks (or other mass storage devices) on the backup computer system appear like they were disks on the file server computer. By mirroring data by writing to both the mass storage of the file server and through the mass storage emulator and mass storage access program to the disks on the backup computer, a copy of the data on the file server computer is made. Optionally, selected portions of the data read through the mass storage emulator program can be altered before being returned as the result of the read operation on the file server. In the event of failure of the file server computer, the backup computer can replace the file server, using the copy of the file server's data stored on its disks. A single backup computer can support a plurality of file server computers. Unlike other redundant file server configurations, this method does not require the backup computer system to be running the file server operating system.

25 Claims, 4 Drawing figures

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Draw D
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☐ 5. Document ID: US 5812748 A

L6: Entry 5 of 9

File: USPT

Sep 22, 1998

US-PAT-NO: 5812748

DOCUMENT-IDENTIFIER: US 5812748 A

**\*\* See image for Certificate of Correction \*\***

TITLE: Method for improving recovery performance from hardware and software errors in a fault-tolerant computer system

DATE-ISSUED: September 22, 1998

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Ohran; Richard S.	Provo	UT		
Rollins; Richard N.	Orem	UT		
<u>Ohran; Michael R.</u>	Orem	UT		
Marsden; Wally	Provo	UT		

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Vinca Corporation	Orem	UT			02

APPL-NO: 08/ 442415 [PALM]

DATE FILED: May 16, 1995

PARENT-CASE:

CROSS-REFERENCES TO RELATED APPLICATIONS This is a continuation-in-part of U.S. patent applications with Ser. No. 08/094,755, filed Jul. 20, 1993, now abandoned, and Ser. No. 08/081,391 filed Jun. 23, 1993, now abandoned.

INT-CL: [06] G06 F 11/00

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US-CL-ISSUED: 395/182.02; 395/180.09, 395/182.11, 395/183.05

US-CL-CURRENT: 714/4; 714/11, 714/13, 714/29

FIELD-OF-SEARCH: 395/800, 395/181, 395/183.05, 395/182.08, 395/182.11, 395/182.13, 395/182.09, 395/182.02, 395/800.01

PRIOR-ART-DISCLOSED:

#### U.S. PATENT DOCUMENTS

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<u>5005122</u>	April 1991	Griffin et al.	364/200
<u>5157663</u>	October 1992	Major et al.	371/9.1
<u>5276867</u>	January 1994	Kenley et al.	395/600
<u>5307481</u>	April 1994	Shiazaki et al.	395/575
<u>5343477</u>	August 1994	Yamada	371/8.2
<u>5403639</u>	April 1995	Belsan et al.	395/600
<u>5404508</u>	April 1995	Konrad et al.	395/600
<u>5408649</u>	April 1995	Beshears et al.	395/575
<u>5455932</u>	October 1995	Major et al.	395/489
<u>5513314</u>	April 1996	Kandasamy et al.	395/182.04
<u>5515502</u>	May 1996	Wood	395/182.13
<u>5530855</u>	June 1996	Satoh et al.	395/600
<u>5533191</u>	July 1996	Nakam	395/182.09
<u>5537533</u>	July 1996	Staheli et al.	395/182.03
<u>5537585</u>	July 1996	Blickenstaff et al.	395/600
<u>5544347</u>	August 1996	Yanai et al.	395/489
<u>5572709</u>	November 1996	Fowler et al.	395/500

#### OTHER PUBLICATIONS

"White Paper--Compaq On-Line Recovery Server, Executive Summary," Compaq, Sep. 1995.

Dinman, S. B., "Micro backup\*devices: protecting your data from equipment failure," Government Computer News, vol. 7, No. 19, p. 85(5).

Gershen, "RAID and Reliability," RS Magazine, Sep. 1992.

Bolles, "A RAID Stack: Micropolis' Raidion," Network Computing, Jun. 1992.

Sullivan, "NCR Disk Array Software Supports Multilevel RAID."..

Busse, "High-end Sanyo Disk System Offers Multiple RAID Levels," News/Networking, Sep. 28, 1992.

Gilloly, "Firm Offers High-end Mass Storage System for LANS.".

Costlow, "DG Sets Up RAID Unit," Electronic Engineering Times, Sep. 21, 1992.

Dryden, "Fail-safe Subsystems Grow, RAID Components Shipping," News & Analysis, Sep. 12, 1992.

Alford, "Disk Arrays Explained," Byte, Oct. 1992.

Francis, "Getting Ready for PC RAID," Datamation, May 15, 1992.

Carr, "An Array of Protection for Server Data," Data Communications, May 1992.

O'Brien, RAID 7 Architecture Features Asynchronous Data Transfers, Computer Technology Review, Spring 1992.

Lawrence, "No More Data Loss: the BYTE Lab Tests Six Disk-Array Subsystems," Byte, Aug., 1992.

McGee, "Hidden Expense," System and Network Integration, Jun. 29, 1992.

Costlow, "RAID Launch Gains Momentum," Electronic Engineering Times, 1992.  
 Dryden, "Users Cite RAID's Benefits and Concerns," LAN Times, May 25, 1992.  
 Bowden, "RAID: The Next Step in Disk Subsystems," LAN Times, May 25, 1992.  
 Robinson, "Network Disk Drives Help Efficiency," Computing, Oct. 4, 1992.  
 Patterson, et al., A Case for Redundant Arrays for Inexpensive Disks (RAID), Report No. UCB.CSD 87/391, Dec. 1987.  
 Bhide et al., "A Highly Available Network File Server", USENIX--Winter '91, pp. 199-200, 203-205, 1991.  
 Steinberg, "Diverting Data from Disaster", Digital Review, v8, n35, Nov. 1991, p. 47.

ART-UNIT: 273

PRIMARY-EXAMINER: Bowler; Alyssa H.

ASSISTANT-EXAMINER: Davis, Jr.; Walter D.

ATTY-AGENT-FIRM: Workman Nydegger Seeley

ABSTRACT:

A method for providing rapid recovery from a network file server failure through the use of a backup computer system. The backup computer system runs a special mass storage access program that communicates with a mass storage emulator program on the network file server, making the disks (or other mass storage devices) on the backup computer system appear like they were disks on the file server computer. By mirroring data by writing to both the mass storage of the file server and through the mass storage emulator and mass storage access program to the disks on the backup computer, a copy of the data on the file server computer is made. Optionally, selected portions of the data read through the mass storage emulator program can be altered before being returned as the result of the read operation on the file server. In the event of failure of the file server computer, the backup computer can replace the file server, using the copy of the file server's data stored on its disks. A single backup computer can support a plurality of file server computers. Unlike other redundant file server configurations, this method does not require the backup computer system to be running the file server operating system.

26 Claims, 10 Drawing figures

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KMIC	Drawn De
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☐ 6. Document ID: US 5649152 A

L6: Entry 6 of 9

File: USPT

Jul 15, 1997

US-PAT-NO: 5649152

DOCUMENT-IDENTIFIER: US 5649152 A

**\*\* See image for Certificate of Correction \*\***

TITLE: Method and system for providing a static snapshot of data stored on a mass storage system

DATE-ISSUED: July 15, 1997

INVENTOR-INFORMATION:

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NAME	CITY	STATE	ZIP CODE	COUNTRY
Ohran; Richard S.	Provo	UT		
<u>Ohran; Michael R.</u>	Orem	UT		

## ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Vinca Corporation	Orem	UT			02

APPL-NO: 08/ 322697 [PALM]

DATE FILED: October 13, 1994

INT-CL: [06] G06 F 12/00, G06 F 12/08

US-CL-ISSUED: 395/441; 395/489, 395/488, 395/182.03, 395/182.04

US-CL-CURRENT: 711/114; 711/161, 711/162, 714/5, 714/6

FIELD-OF-SEARCH: 395/412, 395/413, 395/417, 395/419, 395/462, 395/441, 395/440, 395/488, 395/489, 395/183.18, 395/468, 395/469, 395/470, 395/492, 395/182.03, 395/182.04, 371/10.2

PRIOR-ART-DISCLOSED:

## U.S. PATENT DOCUMENTS

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<u>3054560</u>	September 1962	Hartley	235/151
<u>3303474</u>	February 1967	Moore et al.	340/172.5
<u>3444528</u>	May 1969	Lovell et al.	340/172.5
<u>3533082</u>	October 1970	Schnabel et al.	340/172.5
<u>3544477</u>	December 1970	Heller	252/301.1
<u>3557315</u>	January 1971	Kobus et al.	179/15
<u>3602900</u>	August 1971	Delaigue et al.	340/172.5
<u>3623014</u>	November 1971	Doelz et al.	340/172.5
<u>3636331</u>	January 1972	Amrehn	235/151.12
<u>3665173</u>	May 1972	Bouricius et al.	235/153
<u>3681578</u>	August 1972	Stevens	235/153
<u>3725861</u>	April 1973	Hancock	340/146.1
<u>3735356</u>	May 1973	Yates	340/172.5
<u>3754211</u>	August 1973	Rocher et al.	340/146.1
<u>3760364</u>	September 1973	Yamauchi et al.	340/172.5
<u>3761884</u>	September 1973	Avsan et al.	340/172.5
<u>3771137</u>	November 1973	Barner et al.	340/172.5
<u>3803568</u>	April 1974	Higashide	340/213R
<u>3810119</u>	May 1974	Zieve et al.	340/172.5
<u>3810121</u>	May 1974	Chang et al.	340/172.5
<u>3812469</u>	May 1974	Hauck et al.	340/172.5
<u>3820085</u>	June 1974	Zelinski	340/172.5
<u>3824547</u>	July 1974	Green et al.	340/146.1BA
<u>3828321</u>	August 1974	Wilber et al.	340/172.5

<u>3864670</u>	February 1975	Inoue et al.	340/172.5
<u>3865999</u>	February 1975	Spitaels	179/175.2R
<u>3889237</u>	June 1975	Alferness et al.	340/172.5
<u>3959638</u>	May 1976	Blum et al.	235/153AK
<u>4012717</u>	March 1977	Censler et al.	340/172.5
<u>4051461</u>	September 1977	Hashimoto et al.	364/900
<u>4073005</u>	February 1978	Parkin	364/200
<u>4076961</u>	February 1978	Holsinger et al.	179/2DP
<u>4099241</u>	July 1978	Ossfeldt	364/200
<u>4118772</u>	October 1978	Takada	364/119
<u>4141066</u>	February 1979	Keiles	364/119
<u>4152764</u>	May 1979	Conners et al.	364/200
<u>4156901</u>	May 1979	Haraden et al.	362/296
<u>4159517</u>	June 1979	Paradine et al.	364/200
<u>4164017</u>	August 1979	Randall	364/200
<u>4191996</u>	March 1980	Chesley	364/200
<u>4208715</u>	June 1980	Kumahara et al.	364/200
<u>4228503</u>	October 1980	Waite et al.	364/200
<u>4257009</u>	March 1981	Yorkanis	330/51
<u>4270167</u>	May 1981	Koehler et al.	364/200
<u>4282572</u>	August 1981	Moore, III et al.	364/200
<u>4318173</u>	March 1982	Freedman et al.	364/200
<u>4332027</u>	May 1982	Malcolm et al.	370/94
<u>4351023</u>	September 1982	Richer	364/187
<u>4358823</u>	November 1982	McDonald et al.	364/200
<u>4359718</u>	November 1982	Payen	340/825.03
<u>4371754</u>	February 1983	De et al.	179/18EE
<u>4378588</u>	March 1983	Katzman et al.	364/200
<u>4380047</u>	April 1983	Eisenhard et al.	364/200
<u>4380067</u>	April 1983	Beardsley et al.	371/11
<u>4402046</u>	August 1983	Cox et al.	364/200
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ART-UNIT: 235

PRIMARY-EXAMINER: Harvey; Jack B.

ASSISTANT-EXAMINER: Etienne; Ario

ATTY-AGENT-FIRM: Workman Nydegger Seeley

## ABSTRACT:

A system and method for providing a static snapshot, or image, of data stored on a mass storage system are disclosed. First, a preservation memory is cleared and a virtual device is created. Whenever a write is to be performed on the mass storage system, a check is made of the preservation memory to determine if it contains a block associated with the mass storage write address. If there is not, a copy of

the block in the mass storage system at the block write address is placed in the preservation memory. Whenever a read is to be performed on the virtual device, a check is made of the preservation memory to determine if it contains a block associated with the virtual device read address. If there is such a block, that block is returned as the result of the virtual device read. Otherwise, the block at the virtual device block read address is returned as the result.

25 Claims, 5 Drawing figures

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KIMC	Draw. De
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☐ 7. Document ID: WO 3003153 A2

L6: Entry 7 of 9

File: EPAB

Jan 9, 2003

PUB-NO: WO003003153A2

DOCUMENT-IDENTIFIER: WO 3003153 A2

TITLE: MIRRORING NETWORK DATA TO ESTABLISH VIRTUAL STORAGE AREA NETWORK

PUBN-DATE: January 9, 2003

INVENTOR-INFORMATION:

NAME

COUNTRY

OHRAN, MICHAEL R

ASSIGNEE-INFORMATION:

NAME

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LEGATO SYS INC

US

APPL-NO: US00220079

APPL-DATE: June 25, 2002

PRIORITY-DATA: US89216101A (June 26, 2001)

INT-CL (IPC): G06 F 0/

ABSTRACT:

CHG DATE=20031112 STATUS=O>Mirroring data to provide a virtual storage area network (340) using policing protocols (311, 321) and mirror engines (317, 327) without a physical shared storage node. The mirror engines (317, 327) are found at each server computer (310, 320) in the network (301) in order to mirror the data between mass storage devices (319, 329) of the servers (310, 320) as the servers receive and execute write operations, which results in each mass storage device containing the same stored data. The policing protocols (311, 321) prevent data corruption by not allowing more than one server (310, 320) at a time write to a file of data. If one server (310, 320) experiences failure and is incapable of providing access to network data, the other server or servers can service all read requests, since all network data is accessible by all servers. Unlike conventional storage area networks, there is no physical shared storage node and, accordingly, the costs of obtaining and operating the virtual storage area network (340) are relatively small.

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KMIC	Draw De
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☐ 8. Document ID: WO 9612232 A1

L6: Entry 8 of 9

File: EPAB

Apr 25, 1996

PUB-NO: WO009612232A1

DOCUMENT-IDENTIFIER: WO 9612232 A1

TITLE: SNAPSHOT OF DATA STORED ON A MASS STORAGE SYSTEM

PUBN-DATE: April 25, 1996

## INVENTOR-INFORMATION:

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APPL-NO: US09513324

APPL-DATE: October 10, 1995

PRIORITY-DATA: US32269794A (October 13, 1994)

INT-CL (IPC): G06 F 12/16; G06 F 12/08

EUR-CL (EPC): G06F011/00

## ABSTRACT:

A method for providing a static snapshot, or image, of data stored on a mass storage system (104). At the start of the method, a preservation memory (106) is cleared and a virtual device is created. Whenever a write is to be performed on the mass storage system (104), a check is made of the preservation memory (106) to determine if it contains a block associated with the mass storage write address. If there is not, a copy of the block in the mass storage system (104) at the block write address is placed in the preservation memory (106). Whenever a read is to be performed on the virtual device, a check is made of the preservation memory (106) to determine if it contains a block associated with the virtual device read address. If there is such a block, that block is returned as the result of the virtual device read. Otherwise, the block at the virtual device block read address is returned as the result.

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KMIC	Draw De
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☐ 9. Document ID: WO 9500906 A1

L6: Entry 9 of 9

File: EPAB

Jan 5, 1995

PUB-NO: WO009500906A1

DOCUMENT-IDENTIFIER: WO 9500906 A1

TITLE: METHOD FOR IMPROVING DISK MIRRORING ERROR RECOVERY IN A COMPUTER SYSTEM  
INCLUDING AN ALTERNATE COMMUNICATION PATH

PUBN-DATE: January 5, 1995

## INVENTOR-INFORMATION:

NAME	COUNTRY
ROLLINS, RICHARD N	US
OHRAN, MICHAEL R	US
JOHNSON, RANDALL C	US
BONSTEEL, SCOTT	US
OHRAN, RICHARD S	US

## ASSIGNEE-INFORMATION:

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APPL-NO: US09407009

APPL-DATE: June 21, 1994

PRIORITY-DATA: US08139193A (June 23, 1993)

INT-CL (IPC): G06 F 11/34

EUR-CL (EPC): G06F011/20; G06F011/20, G06F011/20 , G06F011/20

## ABSTRACT:

CHG DATE=19990617 STATUS=O>A method for reducing the time necessary to recover from a processor (111, 121) failure in a fault-tolerant computer system with redundant server computer systems (110, 120) with their own disk storage systems is disclosed and claimed. In normal operation whenever data is to be written to disk storage, each of the servers writes an identical copy of the data to its own disk storage system. When a server processor fails and then is restored to operation, that server's disk storage system must be made identical to (consistent with) the disk storage system of the non-failing server before the system is again fault tolerant. This method improves performance by electronically transferring the disk storage system from the failing server to a non-failing server, having the non-failing server keep the transferred disk storage system identical to its normal disk storage system, and reconnecting the transferred disk storage system to the failed server when it again becomes available. This minimizes the processing time required to make the disk storage contents identical, both at the time of failure and at the time of restoration.

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Draw De
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Terms	Documents
"ohran, michael".in.	9

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L6: Entry 1 of 9

File: PGPB

Aug 15, 2002

PGPUB-DOCUMENT-NUMBER: 20020112134

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020112134 A1

TITLE: Incrementally restoring a mass storage device to a prior state

PUBLICATION-DATE: August 15, 2002

## INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Ohran, Richard S.	Henderson	NV	US	
<u>Ohran, Michael R.</u>	Orem	UT	US	

APPL-NO: 10/ 029189 [PALM]

DATE FILED: December 20, 2001

## RELATED-US-APPL-DATA:

Application is a non-provisional-of-provisional application 60/257499, filed December 21, 2000,

INT-CL: [07] G06 F 12/16

US-CL-PUBLISHED: 711/162; 711/114, 714/6

US-CL-CURRENT: 711/162; 711/114, 714/6

REPRESENTATIVE-FIGURES: 3

## ABSTRACT:

Restoring a mass storage device, including the corresponding data blocks stored thereon, to a state in which it existed at a prior instant in time to minimize the data loss caused by data blocks becoming corrupt or lost. After a mirrored or backup copy has been made, data blocks that are to be overwritten in response to a write request are stored in a preservation memory prior to being overwritten. The data blocks stored in the preservation memory are time-stamped to designate the chronological order by which the data blocks were overwritten. If data becomes corrupted, the data blocks of the preservation memory are applied to the corrupted data in reverse chronological order until such time that a valid, non-corrupted set of data is obtained. In this manner, data more recent than that associated with the full mirrored or backup copy can be reconstructed.

## RELATED APPLICATION

[0001] This application claims the benefit of U.S. Provisional Patent Application Serial No. 60/257,499, entitled "Methods and Systems for Backing Up and Restoring Computer Data, " filed Dec. 21, 2000, which is incorporated herein by reference.

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File: PGPB

Nov 1, 2001

PGPUB-DOCUMENT-NUMBER: 20010037371  
PGPUB-FILING-TYPE: new  
DOCUMENT-IDENTIFIER: US 20010037371 A1

TITLE: Mirroring network data to establish virtual storage area network

PUBLICATION-DATE: November 1, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
<u>Ohran, Michael R.</u>	Orem	UT	US	

APPL-NO: 09/ 892161      [\[PALM\]](#)  
DATE FILED: June 26, 2001

RELATED-US-APPL-DATA:

Application 09/892161 is a continuation-in-part-of US application 09/271585, filed March 18, 1999, PENDING

Application 09/271585 is a continuation-of US application 08/848139, filed April 28, 1997, US Patent No. 5978565

INT-CL: [07] G06 F 15/167

US-CL-PUBLISHED: 709/214; 709/232

US-CL-CURRENT: 709/214; 709/232

REPRESENTATIVE-FIGURES: 1

ABSTRACT:

Mirroring data to provide a virtual storage area network using policing protocols and mirror engines without a physical shared storage node. The mirror engines are found at each server computer in the network in order to mirror the data between mass storage devices of the servers as the servers receive and execute write operations, which results in each mass storage device containing the same stored data. The policing protocols prevent data corruption by not allowing more than one server at a time write to a file of data. If one server experiences failure and is incapable of providing access to network data, the other server or servers can service all read requests, since all network data is accessible by all servers. Unlike conventional storage area networks, there is no physical shared storage node and, accordingly, the costs of obtaining and operating the virtual storage area network are relatively small.

RELATED APPLICATIONS

[0001] This application is a continuation-in-part of U.S. patent application Ser. No. 09/271,585, entitled "Operation of Standby Server to Preserve Data Stored By a

Network Server," filed Mar. 18, 1999, which is a continuation of U.S. patent application Ser. No. 08/848,139, filed Apr. 28, 1997, entitled "Method for Rapid Recovery from a Network File Server Failure Including Method for Operating Co-Standby Servers," now issued as U.S. Pat. No. 5,978,565. The foregoing patent and patent application are incorporated herein by reference.

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